ABSTRACT

Explanatory note size – 94 pages, contains 13 illustrations, 28 tables, 2 applications, 20 references.

Topicality. Examines the problem of analyzing the characteristics of automobile traffic flow, shows the main features of existing methods for assessing static and dynamic indicators of transport traffic, their advantages and disadvantages. The need for improving methods and approaches capable of comprehensively assessing the state of the traffic flow in a mode close to real time has been identified.

The aim of the study. The main goal is to improve the accuracy, processing speed, and scalability of video surveillance analysis for its further use in transportation infrastructure management systems.

The object of research: software for video monitoring of automobile traffic flow.

The subject of research: approaches, methods and software for processing and analyzing video data to determine the characteristics of the traffic flow.

To achieve this goal, the **following tasks** were formulated:

- analyze modern methods and software solutions for video monitoring of road traffic;
- determine the requirements for the video monitoring system of traffic flow;
- develop an approach for automatic determination of the road surface mask;
- create a multi-class indicator for assessing the characteristics of traffic flow;
- create a single model for assessing static and dynamic indicators of traffic flow;
- develop software for automated video monitoring of traffic;
- assess the efficiency and accuracy of the proposed methods and software.

The scientific novelty of the results of the master's dissertation is:

- the approach to automatic determination of the road surface in a mode close to real time has been proposed, which combines the detection of marking lines, geometric filtering, analysis of perspective transformation and the formation of a polygonal road mask;
- the TLCR and MTLCR indicators have been improved for a better assessment of roadway congestion, taking into account different types of vehicles and their impact on throughput;
- the unified approach to determining static and dynamic characteristics of traffic flow has been proposed based on a single object segmentation model, which simultaneously determines vehicle masks, their classes, positions and bounding boxes.

The practical value of the obtained results is the developed method provides determination of traffic flow characteristics in a mode close to real time and can be used to optimize traffic lights, predict congestion, analyze infrastructure and statistical monitoring. In addition, the proposed approach can be applied to other types of traffic**.**

Relationship with working with scientific programs, plans, topics. Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky» within the initiative research «Methods, models and environment for designing and evaluating the effectiveness of artificial intelligence software tools for monitoring and control systems», state registration number 0125U001681.

Approbation. The scientific provisions of the dissertation were tested at the V International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies (Soft Tech-2025)" - Kyiv.

Publications. The scientific provisions of the dissertation were published in:

1) Protsenko R.O., Stetsenko I.V. Method and software tools for video monitoring of characteristics of automobile traffic flow. Software engineering and advanced information technologies (Soft Tech-2025): materials of the IX International Scientific and Practical Conference of Young Scientists and Students, November

26-27, 2025, Kyiv, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, FIOT.

2) Protsenko R.O., Stetsenko I.V. (2026). Method and software tools for video monitoring of characteristics of automobile traffic flow. Interdepartmental scientific and technical collection "Adaptive automatic control systems" 1(48) [Accepted for publication].

Keywords: VIDEO MONITORING, TRAFFIC FLOW, TLCR, ROADWAY, VEHICLE TRACKING.